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AMENDMENTS TO THE DRAWINGS

The attached three replacement sheets of drawings include new Figures 5, 6, 7A, 7B, and 7C.

The first replacement sheet for --Sheet 5 of 7-- includes Figure 5. Figure 5 is designated by a legend --Prior Art--.

The second replacement sheet for --Sheet 6 of 7-- includes Figure 6. Figure 6 is designated by a legend --Prior Art--.

The third replacement sheet for --Sheet 7 of 7-- includes Figures 7A, 7B, and 7C. Figures 7A, 7B, and 7C are each designated by a legend --Prior Art--.

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REMARKS

In the drawings, Figures 5, 6, 7A-7C are each designated by a legend --Prior Art--.

In the claims, claims 1, 3, 18, 21, and 24 have been amended and are supported at least by original claim 2 and Figure 2A. Claim 3 is further amended to track with canceled claim 2 and now depends on claim 1.

Claim 2 has been canceled.

Claims 1 and 3-25 are pending.

Reconsideration and reexamination of the application are requested.

Drawings

Figures 5, 6, 7A, 7B, and 7C were objected to for not being designated by a legend such as --Prior Art--. Attached to this paper are three replacement sheets, Sheet 5 of 7, Sheet 6 of 7, and Sheet 7 of 7, wherein Figures 5, 6, 7A, 7B, and 7C are designated by a legend --Prior Art--. No new matter is added.

Claim Rejections - 35 USC 102

Claims 1, 14-17, and 24-25 were rejected under 35 USC 102(a) as being anticipated by Applicants' Admitted Prior Art (AAPA) on pages 1-5 of the specification and Figures 5, 6, 7A, 7B, and 7C. Applicants do not concede the correctness of the rejection.

The rejection admits that AAPA fails to teach a smoothing unit having more than one diffusion layer (page 3 of the Office Action). Accordingly, AAPA does not anticipate claims 1 and 24. Further, AAPA also does not anticipate claims 14-17 and 25 for at least the same reasons. A favorable reexamination and reconsideration are requested.

Claim Rejections - 35 USC 103

Claims 2-13 and 18-23 were rejected under 35 USC 103(a) as being unpatentable over AAPA on page 1-5 of the Specification and Figures 5, 6, 7A, 7B, and 7C in view of Hyneczek et al. (US 5151380). Applicants respectfully traverse this rejection.

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The rejection states that Hynecek et al. teaches forming a plurality of diffusion layers and this would make it obvious to one of ordinary skill in the art to eliminate the effects of pocket potentials in a solid-state imaging device by including numerous diffusion layers at various locations and depths to improve the performance of the image. Applicants respectfully disagree.

Hynecek recognized a parasitic potential well problem at the interfaces between a clocked gate and virtual gate regions (column 10, lines 6-15). Hynecek teaches that this problem is "completely eliminated by using a suitable doping profile for the buried channel" such as a buried channel formed by two different impurity profiles (column 10, lines 15-19). Hynecek's solution is two layers formed below the gate electrodes of a transistor (see Hynecek Figures 12a and 12b). Accordingly, because the Hynecek's recognized problem is completely solved by two layers formed below the gate electrodes of a transistor, Hynecek does not suggest trying other shapes, regions, and/or numbers of layers more than two for structures that face other problems.

Further, regarding claim 10, Hynecek's buried channels do not have an end as the claim requires. Hynecek's buried channel is completely below the gate electrodes and thus fails to teach or suggest the importance of distance between a photodiode and any of the layers.

Further, Hynecek teaches a "CCD image sensor with high density integration" (column 2, lines 20). Hynecek teaches and suggests that a high density integration means a CCD image sensor that provides lateral isolation between adjacent cells while occupying a minimum amount of the cell's surface area is needed (see column 2, lines 10-17). This further teaches away from having a doped buried channel positioned in other shapes or regions that would take up the cell's surface area. Therefore, it would not be obvious to one of ordinary skill in the art to include numerous diffusion layers at various locations and depths in view of Hynecek. Applicants respectfully request a favorable reexamination and reconsideration of the claims.

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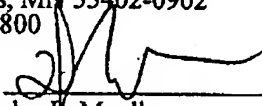
In view of the above, it is submitted that the application is in condition for allowance. Reconsideration and reexamination are requested. Allowance of all pending claims at an early date is solicited. Any questions regarding this communication can be directed to the undersigned attorney, Douglas P. Mueller (Reg. No. 30,300), at (612) 455-3804.



Dated: July 3, 2007

Respectfully submitted,

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